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24 January 1990

Ms. Carla Fisher
U.S. Environmental Protection Agency
Region 10, Water Division
1200 Sixth Avenue
Seattle, WA 98101

Subject: Anchorage permit modifications

Dear Carla:

I have reviewed the Anchorage Water and Wastewater Utility's (AWWU) requested modifications to their NPDES permit which was summarized in the 30 October 1989 letter to you. The following attachment represents a discussion of each of the requested modifications. The requests have been numbered based on the order of presentation in the October letter. Their requests have been interpreted based on the potential effect on EPA's ability to determine compliance and the terms under which modifications may occur as stated in the permit.

Please call me if you would like to discuss any of these points further. Thanks for the opportunity to assist you.

Sincerely,

Nancy Musgrove
Marine Biologist

TC 4118-13

CC: Bill Muellenhoff, Tt
Mills Soldate, Tt

REVIEW OF ANCHORAGE
PERMIT MODIFICATIONS
REQUESTED 30 OCTOBER 1989
LETTER TO C. FISHER

- 1) Switch sampling point for dissolved oxygen from primary to final effluent.

Currently dissolved oxygen measurements are taken from a sample collected in the effluent prior to chlorination. Movement of the sampling location to the effluent after chlorination will allow a more representative characterization of the final effluent to be made.

- 2) Reduce sampling of biochemical oxygen demand (5-day test) to Monday through Thursdays only (i.e. drop weekend sampling).

Currently the Anchorage Water and Wastewater Utility (AWWU) is required to sample BOD₅ four times a week with periodic representation of weekend conditions in both the influent and effluent. In the three years the permit has been in effect, exceedence of daily limit has occurred on weekend days (including Friday) six times. Over a years time, the requested sampling pattern would probably adequately represent the effluent.

However, part of the rationale in requesting this reduction in sampling frequency is to reduce operating costs by not having to run various analyses on weekends. Based on a review of the fecal coliform data (see point number 5 below), a reduction in bacterial sampling frequency is not recommended. If weekend sampling and analysis for fecal coliform continues, collection and analysis of BOD₅ samples might as well be done too.

- 3) Reduce total suspended solids sampling to weekdays only.

Currently total suspended solids are measured five times a week with periodic representation of weekend conditions in both the influent and effluent. Once again, it appears a reduction in frequency has been requested as a cost-saving measure. Typically, total suspended solids are in compliance. Weekday sampling will probably accurately represent total suspended solids for influent and effluent. However, if other weekend sampling continues to be required, total suspended solids might as well be included.

- 4) Drop requirement for sampling sludge prior to thickening.

According to monitoring reports, a single sample for total solids is taken from the waste stream prior to dewatering the sludge. Additional sludge samples are collected from the belt filter press for chemistry analyses. The AWWU has stated that the total solids sample prior to dewatering is not an accurate representation of plant efficiency. If "efficiency" is

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evaluated based on the removal of solids from the wastewater during treatment, a sample from the final effluent would be more representative of removal efficiency. If "efficiency" pertains to how well the plant handles the sludge, a solids sample from the belt filter press would more accurately characterize the sludge handling process. Depending on the goals of the efficiency evaluation, changing the sampling location for total solids would be appropriate.

- 5) Reduce fecal coliform monitoring to Monday, Tuesday, and Wednesday only (i.e., drop any sampling for Thursday, Friday, Saturday or Sunday).

Currently, fecal coliform samples are collected three times a week with periodic representation of coliform abundance on weekends. In support of the requested decrease in sampling frequency, the discharger presented an analysis of fecal coliform abundance from effluent samples taken on different days of the week. AWWU stated that results were highly variable and suggested that this variability was related to the day of the week and the amount of flow and total residual chlorine present. AWWU performed an analysis of variance (ANOVA) to determine if significant differences in fecal coliform abundance occurred among the days of the week. They concluded that fecal coliform abundance differed by day of the week and used a range test to determine that fecal coliform abundance on Saturday and Sunday was significantly different from all other days of the week. It was hypothesized that fecal coliform abundance was lower on weekends due to reduced flow and therefore greater retention time and exposure to chlorine. A correlation analysis for fecal coliform abundance and total residual chlorine was performed. AWWU concluded that coliform abundance was inversely related ($r = -0.47$) to total residual chlorine and could be predicted by total residual chlorine concentrations.

A correlation coefficient of -0.47 means that 47 percent of the variability observed in fecal coliform abundance can be explained by total residual chlorine concentrations (i.e., greater than 50 percent of the variability is due to some other factor). Generally, this level of correlation is not considered adequate to describe what is controlling total fecal coliform abundance. In addition, examination of daily flow values from several months (October and May) in all three years of the permit found that flows frequently were higher on the weekends. AWWU stated that there was no correlation between fecal coliform abundance and flow.

In review, it does not appear that sampling fecal coliform abundance on Monday, Tuesday and Wednesday only will adequately represent bacterial abundance in the effluent.

- 6) Reduce monitoring of oil and grease to monthly.

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Currently the AWWU is required to measure oil and grease weekly with periodic representation of weekend conditions. The discharger has requested a reduction in sampling frequency based on the consistency and slight decrease in oil and grease values over time. The discharger stated that oil and grease values have decreased since the beginning of the permit term. Based on yearly average concentrations, this trend can be observed. However, the range of values represented by the monthly average oil and grease concentrations is approximately the same for each permit year.

	Average (mg/l)	Minimum (mg/l)	Maximum (mg/l)
Year 1	26.8	13.4	36.4
Year 2	21.4	11.1	29.7
Year 3	18.1	12.2	27.4

According to the permit, weekend sampling may be omitted, but no criteria are given for a further reduction in sampling frequency.

7) Reduce monitoring of trace metals to quarterly.

Terms of the permit require that monitoring of trace metals occur weekly during year 1 and 4 and monthly for all other permit years. A footnote to the effluent monitoring requirements states that monitoring may be more frequent (weekly) during those years where monthly monitoring is in effect but there is no allowance for decreased frequency.

8) Eliminate monitoring of hexavalent chromium and free cyanide.

The discharger is currently required to sample hexavalent chromium and free cyanide weekly during Years 1 and 4 and monthly during Years 2, 3, and 5. Based on discharge monitoring reports, both hexavalent and total chromium are consistently not detected in the effluent and free cyanide occurs at or below total cyanide levels. Since levels of hexavalent chromium and free cyanide are typically less than total forms of these elements, the discharger wants to eliminate these analyses.

Hexavalent chromium and free cyanide represent highly toxic forms of these elements. However, these forms also tend to be transient. The discharger presented data from the last three years to show that total chromium and total cyanide are indicative of concentrations of hexavalent chromium and free cyanide respectively. It seems reasonable at this time to consider dropping these constituents from the chemistry analyses.

It is interesting to note that effluent concentrations for cyanide (both free and total) were an order of magnitude greater than influent concentrations during the second and third year of the permit. No removal is

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expected in a primary treatment plant so effluent levels should be the same as influent levels. It is unclear as to why greater concentrations of cyanide are reported in the effluent. This phenomena may be due to interference in the influent or some problem with the analytical method. Although effluent values are reported to increase during the treatment process, final effluent concentrations are still an order of magnitude less than ambient water quality standards after initial dilution (125:1).

- 9) Sample toxic pollutants and pesticides when effluent bioassays are performed.

The discharger has recommended that chemicals in the effluent be analyzed when bioassays are performed. It does not appear to be cost-effective to do additional analyses of priority pollutants during bioassay sampling at this time since identification of the individual effluent constituents causing toxicity is difficult and tends to be hypothetical. As long as the quarterly sampling is representative of the conditions under which the bioassays were conducted, quarterly samples should be adequate to interpret toxicity, if observed in the bioassays.

- 10) Reduce receiving water monitoring to summers only

The AAWU is required to monitor the receiving environment twice during Years 2, 3, and 5 and four times (spring, summer-wet, summer-dry, and fall) during Years 1 and 4. The discharger states that the frequency of monitoring can be reduced to summer only if it can be shown there are no seasonal differences or that conditions around the outfall do not differ significantly from background levels. AWWU stated that these conditions had been met and therefore requested a reduction in receiving water monitoring.

The discharger stated that some water quality criteria were exceeded (hydrocarbons, cyanide and copper) but attributed the higher levels to high background concentrations since outfall stations were not significantly different than control stations. No data were presented to support this statement. An analysis of these data is needed in order to evaluate the differences among outfall and control stations and is beyond the scope of this quick response. In addition, seasonal differences (or lack of) can not adequately be represented by one years worth of data.

Based on EPA's need for adequate data to determine compliance, reduction in receiving water monitoring frequency is not recommended at this time.